



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/020,647	02/09/1998	JOSEPH FJELSTAD	TESSERA3.0-0	3500

530 7590 12/07/2001

LERNER, DAVID, LITTENBERG,
KRUMHOLZ & MENTLIK
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

EXAMINER

GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 12/07/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/020,647

Applicant(s)

FJELSTAD ET AL.

Examiner

David E Graybill

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

The amendment filed 10-01-01 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is the limitation of both electrolessly plating and selectively etching the conductive material.

Applicant is required to cancel the new matter in the reply to this Office Action.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 48 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The non-described subject matter is the limitation, "electrolessly plating a conductive material over the top of the

Art Unit: 2814

package and selectively etching away portions of the conductive material."

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 36-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 36-44 are rejected as incomplete because they depend on canceled claims 1 and 4.

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a),

Art Unit: 2814

the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 35, 46, 47, 49-54 and 57 are rejected under 35 U.S.C. 102(b) as anticipated by Kwon (5070297) or, in the alternative, under 35 U.S.C. 103(a) as obvious over the combination of Kwon (5070297) and Chen (4671849).

At column 4, line 13 to column 7, line 62, Kwon teaches the following:

35. A method of making a compliant semiconductor chip package comprising: providing a semiconductor chip 14 having a contact bearing surface including a central region bounded by a peripheral region, wherein the peripheral region of said contact bearing surface has chip contacts 36; providing a dielectric protective layer 34 over the contact bearing surface of said semiconductor chip, said dielectric protective layer having apertures for said chip contacts;

Art Unit: 2814

providing a compliant layer 32 over said dielectric protective layer and over the central region of the contact bearing face of said semiconductor chip, wherein said compliant layer has a substantially flat top surface, a bottom surface that is attached to said dielectric protective layer and sloping edges between the top surface and the bottom surface, wherein the sloping edges of said compliant layer have a first curved transition region near the top surface of said compliant layer and a second curved transition region near the bottom surface of said compliant layer; and

selectively electroplating elongated bond ribbons 28 atop said dielectric protective layer and said compliant layer, wherein each said bond ribbon electrically connects one of said chip contacts to an associated conductive terminal 20-22-24 disposed on the top surface of said compliant layer, and wherein said elongated bond ribbons extend along the sloping edges of said compliant layer and have a first curved region overlying the first curved transition region of said compliant layer and a second curved region overlying the second curved transition region of said compliant layer.

45. A method of making a compliant microelectronic package comprising:

Art Unit: 2814

providing a microelectronic element 14 having a first surface and a plurality of contacts disposed on the first surface thereof;

providing a compliant layer over the first surface of said microelectronic element, said compliant layer having a bottom surface facing toward said first surface of said microelectronic element, a top surface facing upwardly away from said microelectronic element and one or more sloping edge surfaces extending between the top and bottom surfaces of said compliant layer, wherein the sloping edges of said compliant layer have first curved transition regions near the top surface of said compliant layer and second curved transition regions near the bottom surface of said compliant layer; and

selectively forming elongated, flexible bond ribbons over the top surface and the sloping edge surfaces of said compliant layer for electrically connecting said contacts to conductive terminals overlying the top surface of said compliant layer, wherein said elongated, flexible bond ribbons extending along the sloping edges of said compliant layer have first curved regions overlying the first curved transition regions of said compliant layer and second curved regions overlying the second curved transition regions of said compliant layer.

46. The method as in 45, wherein the contacts are disposed in a first region of the first surface of said microelectronic element, and said compliant layer overlies a second region of the first surface of said microelectronic element, and wherein the sloping edges of said compliant layer extend along one or more borders between the first and second regions of the first surface of said microelectronic element.

47. The method as in 45, wherein said selectively forming bond ribbons step includes selectively electroplating said bond ribbons.

49. The method as in 45, further comprising:
before the providing a compliant layer step, providing a first dielectric protective layer over the first surface of said microelectronic element, the first dielectric layer having a plurality of apertures in substantial alignment with said contacts for providing access to said contacts, the providing the compliant layer step including the step of providing the compliant layer over said first dielectric protective layer.

50. The method as in 49, the selectively forming flexible bond ribbons step including electroplating said bond ribbons atop said first dielectric protective layer and said compliant layer.

Art Unit: 2814

51. The method as in 45, further including the step of providing a dielectric cover layer 26 over said compliant layer and said bond ribbons after the step of selectively forming said bond ribbons, wherein said dielectric cover layer has a plurality of apertures for accessing said terminals therethrough.

52. The method as in 45, further including the step of providing an encapsulant layer 26 over an exposed surface of said bond ribbons.

53. The method as in 52, further including the step of providing a second dielectric protective layer 21 atop the encapsulant layer, wherein the second dielectric protective layer has a plurality of apertures for accessing said terminals therethrough.

54. The method as in 45, further including before the step of forming said bond ribbons, depositing a barrier metal atop said contacts, wherein said barrier metal minimizes voiding between said contacts and said bond ribbons.

57. The method as in 45, wherein the sloping edge surfaces of said compliant layer extend in both vertical and horizontal directions.

To further clarify the teaching of forming elongated bond ribbons 28, it is noted that Kwon teaches that the contacts 28

Art Unit: 2814

are small and narrow in width in proportion to length or height; therefore, the contacts are elongated.

To further clarify the teaching of first transition regions near the top surface of the compliant layer and second transition regions near the bottom surface of the compliant layer, it is noted that it is inherent that the first and second regions near the top and bottom surface, respectively, transition into neighboring regions of the compliant layer and other neighboring layers.

To further clarify the teaching wherein the sloping edges of the compliant layer have a first curved transition region near the top surface of the compliant layer and a second curved transition region near the bottom surface of the compliant layer, and the elongated bond ribbons have a first curved region overlying the first curved transition region of the compliant layer and a second curved region overlying the second curved transition region of the compliant layer, it is noted that the sloping edges of the compliant layer have a first straight line transition region near the top surface of the compliant layer and a second straight line transition region near the bottom surface of the compliant layer, and the elongated bond ribbons have a first straight line region overlying the first transition

region of the compliant layer and a second straight line region overlying the second transition region of the compliant layer. In addition, a curved region comprises a line defined by an equation so that the coordinates of its points are functions of a single independent variable or parameter. Furthermore, a straight line is defined by an equation so that the coordinates of its points are functions of a single independent variable or parameter; namely, the equation $y = mx + b$. Therefore, the straight line regions of Kwon are curved.

Because applicant appears to have introduced the claimed limitations, "wherein the sloping edges of said compliant layer have a first curved transition region near the top surface of said compliant layer and a second curved transition region near the bottom surface of said compliant layer," and, "wherein said elongated bond ribbons . . . have a first curved region overlying the first curved transition region of said compliant layer and a second curved region overlying the second curved transition region of said compliant layer," primarily in order to overcome a rejection over Kwon, in the alternative, the claims are further rejected under 35 U.S.C. 103(a) as obvious over the combination of Kwon (5070297) and Chen (4671849).

Specifically, Kwon does not appear to explicitly teach curved transition regions. Nonetheless, at column 1, lines 10-

13; and column 3, lines 52-64, Chen explicitly teaches curved transition regions. Moreover, it would have been obvious to combine the process of Chen with the process of Kwon because it would minimize defects in the bond ribbons.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon, or in the alternative, over the combination of Kwon and Chen as applied to claims 35, 46, 47, 49-54 and 57, and further in combination with Nakayama (4935312).

The combination of Kwon and Chen does not appear to explicitly teach the following:

48. The method as in 45, wherein said selectively forming bond ribbons step includes electrolessly plating a conductive material over the top of said package and selectively etching away portions of said conductive material.

Regardless, at column 6, lines 56-66, Nakayama teaches a process wherein a selectively forming bond ribbons 3 step includes electrolessly plating a conductive material over the top of a package and selectively etching away portions of the conductive material. Furthermore, it would have been obvious to combine the process of Nakayama with the process of the applied prior art because it would enable bond ribbon formation.

Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon as applied to claims 35, 46, 47, 49-54 and 57, and further in combination with Palagonia (5874782).

As cited supra, Kwon teaches the following:

55. The method as in 45, wherein the method is applied to a plurality of undiced semiconductor chips on a wafer to form a plurality of compliant semiconductor chip packages.

56. The method as in 45, wherein the method is applied to a plurality of adjacent semiconductor chips arranged in an array to form a corresponding plurality of compliant semiconductor chip packages.

However, Kwon does not appear to explicitly teach separating the packages after the selectively forming elongated, flexible bonds ribbons step, and separating the plurality of compliant semiconductor chip packages from one another following the step of selectively electroplating the bond ribbons.

Nevertheless, at column 1, lines 1-56; column 5, line 64 to column 6, line 6; and column 6, lines 21-39, Palagonia teaches separating packages 22 after a selectively forming elongated, flexible bonds ribbons 26 step, and separating the plurality of compliant semiconductor chip packages from one another following the step of selectively electroplating the bond ribbons. In

addition, it would have been obvious to combine the process of Palagonia with the process of the applied prior art because it would facilitate testing of individual chips.

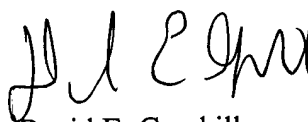
Applicant's remarks filed 10-01-01 have been fully considered and are adequately addressed in the rejection supra.

The prior art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily because it is a continuation in part of a related application.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.



David E. Graybill
Primary Examiner
Art Unit 2814

D.G.
18-Nov-01